What we claim is:

1. A compound layered type of sensing device, comprising:

a plurality of solid electrolyte plates; and

first to third electrochemical cells each having a single pair of electrodes disposed on the solid electrolyte plates, in which a concentration of a gas specified from a gas to be measured pre-processed based on oxygen pumping by the first electrochemical cell is detected by the second electrochemical cell and a difference in electromotive force between the gas to be measured and a reference gas is detected by the third electrochemical cell,

wherein the single pair of electrodes of the third electrochemical cell is disposed on a same surface of one of the solid electrolyte plates, and both of the first and third electrochemical cells are located with different ones of the solid electrolyte plates.

2. The sensing device of claim 1, further comprising first and second chambers formed in the device and into which the gas to be measured is introduced, and a fourth electrochemical cell configured to detect the concentration of the oxygen present in at least one of the first and second chambers.

3. The sensing device of claim 2, wherein the first chamber communicates with an outside of the device via a first diffusive resistance passage and the second chamber communicates with the first chamber via a second diffusive resistance passage,

the first electrochemical cell being configured, with one surface thereof exposed to the first chamber, so as to take oxygen in and out to and from the first chamber correspondingly to voltage applied to the first electrochemical cell, and

the second electrochemical cell being configured, with one surface thereof exposed to the second chamber, so as to detect current corresponding to the concentration of the specified gas contained in the gas to be measured by applying a predetermined voltage to the second electrochemical cell.

4. The sensing device of claim 3, further comprising a plurality of

reference gas chambers,

wherein both of the second and fourth electrochemical cells are disposed to a same one of the reference gas chambers and either one of the first and second chambers.

5. The sensing device of claim 4, wherein each of the first and third electrochemical cells is disposed to a different one of the reference gas chambers.

6. The sensing device of claim 2, further comprising a plurality of reference gas chambers,

wherein both of the second and fourth electrochemical cells are disposed to a same one of the reference gas chambers and either one of the first and second chambers.

7. The sensing device of claim 6, wherein each of the first and third electrochemical cells is disposed to a different one of the reference gas chambers.

8. The sensing device of claim 3, further comprising a plurality of reference gas chambers,

wherein each of the first and third electrochemical cells is disposed to a different one of the reference gas chambers.

9. The sensing device of claim 2, further comprising a plurality of reference gas chambers,

wherein each of the first and third electrochemical cells is disposed to a different one of the reference gas chambers.

10. The sensing device of claim 1, wherein an alumina-made plate intervenes between the first and second electrochemical cells so that both the cells are insulated to each other.

11. A compound layered type of sensing device, comprising:

first and second chambers into which a gas to be measured is introduced, the first chamber communicating with an outside of the

device via a first diffusive resistance passage and the second chamber communicating with the first chamber via a second diffusive resistance passage;

first and second reference gas chambers into which a reference gas is introduced;

a first electrochemical cell, disposed to be exposed to the first chamber, for pumping oxygen correspondingly to voltage applied to the first electrochemical chamber;

a second electrochemical cell, disposed to be exposed to the second chamber, for detecting current corresponding to a concentration of a gas specified in the gas to be measured by applying a predetermined voltage to the second electrochemical chamber;

a third electrochemical cell for measuring a concentration of oxygen contained in the gas to be detected; and

first and second solid electrolyte plates between which the first and second chambers are formed,

wherein the first reference gas chamber is disposed on a surface of the first solid electrolyte plate facing the outside of the device and the second reference gas chamber is disposed to be exposed to the first and second chambers by way of the second solid electrolyte plate;

the first electrochemical cell, disposed with the second solid electrolyte plate, has a pumping electrode exposed to the first chamber and a reference pumping electrode exposed to the second reference gas chamber;

the second electrochemical cell, disposed with the first solid electrolyte plate, has a sensing electrode exposed to the second chamber and a reference sensing electrode exposed to the first reference gas chamber; and

the third electrochemical cell, disposed with the first solid electrolyte plate, has an oxygen sensing electrode facing the outside of the device and a reference oxygen sensing electrode exposed to the first reference gas chamber, both of the oxygen sensing electrode and the reference oxygen sensing electrode being disposed on a same surface of the first solid electrolyte plate.